

47. Оригиналы лунных фотоснимков заново отсканированы. Опять Фотошоп?

12-15 minutes

"Lunar" photographs, according to NASA, were taken with Hasselblad cameras on 70 mm perforated film. The frame itself is square, and there are perforations along the edges of the film. Usually, when images of the Apollo missions are published, we do not see these perforations, but here NASA decided to re-scan the originals of all Apollo missions so that the perforations were visible.

The originals of all the Apollo and Gemini missions themselves are in the Johnson Space Center film archive. The film is stored in metal boxes in a freezer at a temperature of -18 ° C (this is Kodak's recommendation for long-term storage). Due to the importance of these materials, the original film must not leave the building.

Before scanning, the film is gradually brought to room temperature: first, it is stored in an ordinary refrigerator for a day, and then it is kept at room temperature for another day.

I looked at the results of a new scan photographs mission "Apollo 11" on the newly created site "To the Moon" (**to the moon** -<http://tothemoon.ser.asu.edu/about>). The Apollo 11 photographs occupy two folders: one contains 1245 photographs, and the other contains 172 photographs. Taken with Hasselblad 500EL.

There is also a third folder called "Lunar surface close-up", where 35-mm film was used in the Kodak stereo camera, shooting was made from a distance of about 25 cm. Perhaps we will talk about this folder separately sometime.

The feeling from viewing is ambiguous, there is no certainty that these are originals. And not even because of such a huge number of pictures.

Jack White calculated that during extravehicular activities (ie, outside the lunar module) on the Apollo 11 mission, a picture was taken on average every 15 seconds. There is an interesting article about this: **Lunar machine gun *. Or how did the Americans "shoot" an incredible amount of lunar shots?**

The seen pictures are not at all like the originals. With 70 mm film width, the frame size is 55.6 mm and is not centered with respect to the perforations. The distance from the edge of the frame to the perforations on the right side is one and a half times greater than the indent on the left side. It's kind of unprofessional.



This shot was allegedly taken from the command module (which remained in the lunar orbit).

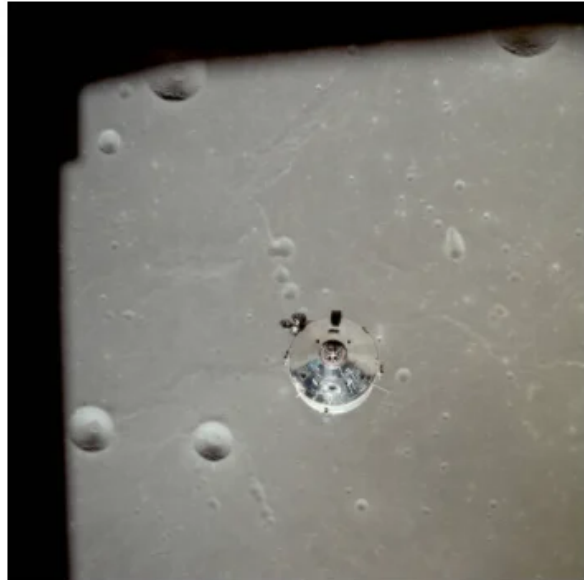
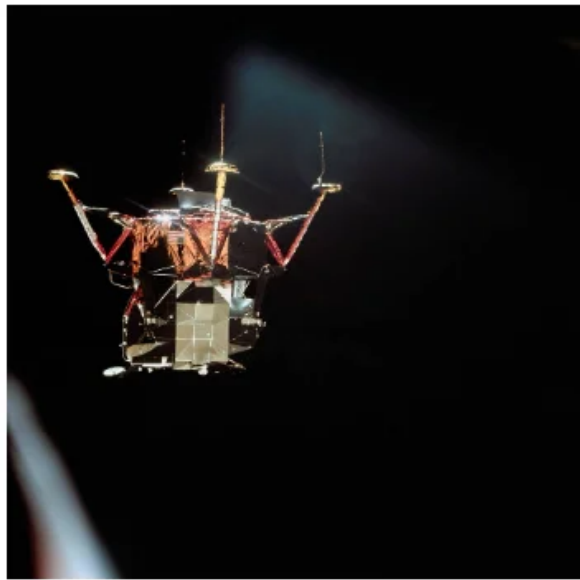
The camera and cassettes are designed so that the center of the lens is at the center of the frame. And here the center of the frame is shifted to the side. This lays the seeds of doubt.

Service inscriptions "KODAK" and "COLOR SAFETY FILM" (colored safety non-flammable film) fit over the perforations.

In addition, as far as I understood, "at the numerous requests of the workers" the color of the lunar surface was repainted brown.

You know that the moon is not gray, as the Americans showed it, but dark brown.

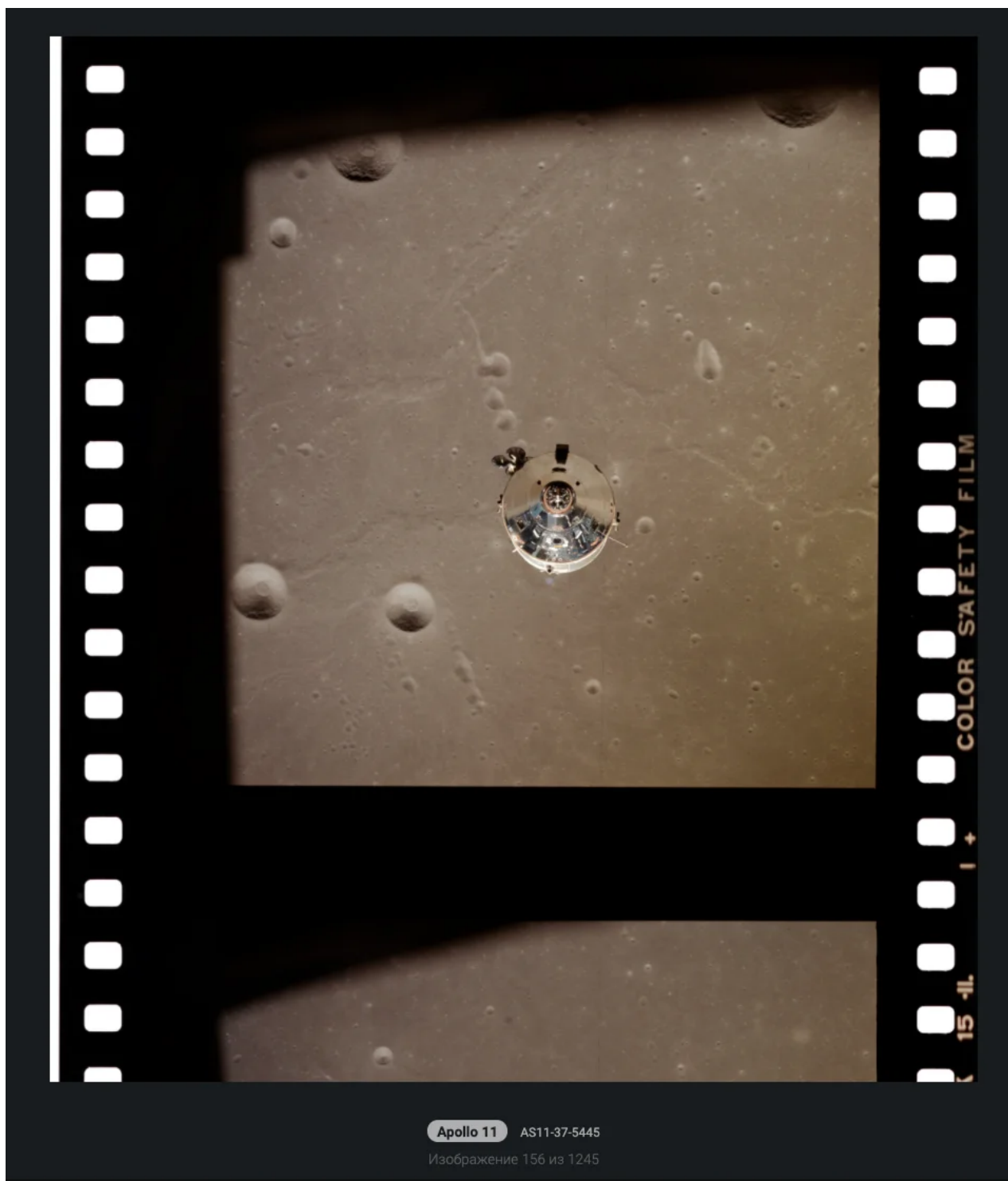
If on [the official NASA website](#) in the image AS11-37-5445 The moon looks gray (image on the right),



Left: Eagle shortly after undocking. Right: Columbia shortly after undocking.

Snapshot from 2019 article on NASA official website (<https://www.nasa.gov/>)

then on the site "To the Moon" (tothemoon) the same frame is already richly brown.



The command module is supposedly against the background of the moon.

In connection with the latest trends of the times, the color of the moon was changed to brown. Or maybe this brown photograph is not the original, but some kind of inaccurate copy from the original?

We have already told the story of how a former NASA engineer in his desk SUDDENLY found a yellow box with "lunar" images, which had been lying there for 40 years. And the NASA engineer thought they might be originals.



Yellow box with copies of moon images.

As soon as I saw these pictures, I immediately realized that these were not originals, but copies. I already wrote in the article "[Tears of St. Jorgen](#)", or how, 40 years later, videos, photographs and even the lunar soil of the Apollo missions were found, that the frame size in those images turned out to be 10% larger than the original, the images were poorly balanced in color (too blue). And that, in general, these personnel are technical defects thrown into the trash can by the technical control department. Their laboratory was rejected, thrown into the trash, and a NASA engineer picked them up. Moreover, these copies were made not on Ektahrom reversible film, but on positive film.

The fact that we have a copy in front of us, I immediately realized without any measurements of the frame - just one element at a time. To make it clear, I will give just such a parallel.

There are cars with front-wheel drive, there are cars with rear-wheel drive. (And of course, I know that there are also four-wheel drive models.) If a person is not a car enthusiast and is not particularly interested in brands of cars, then the type of drive (driving wheels) can be determined when skidding, for example, on snow or in a puddle on a country road.

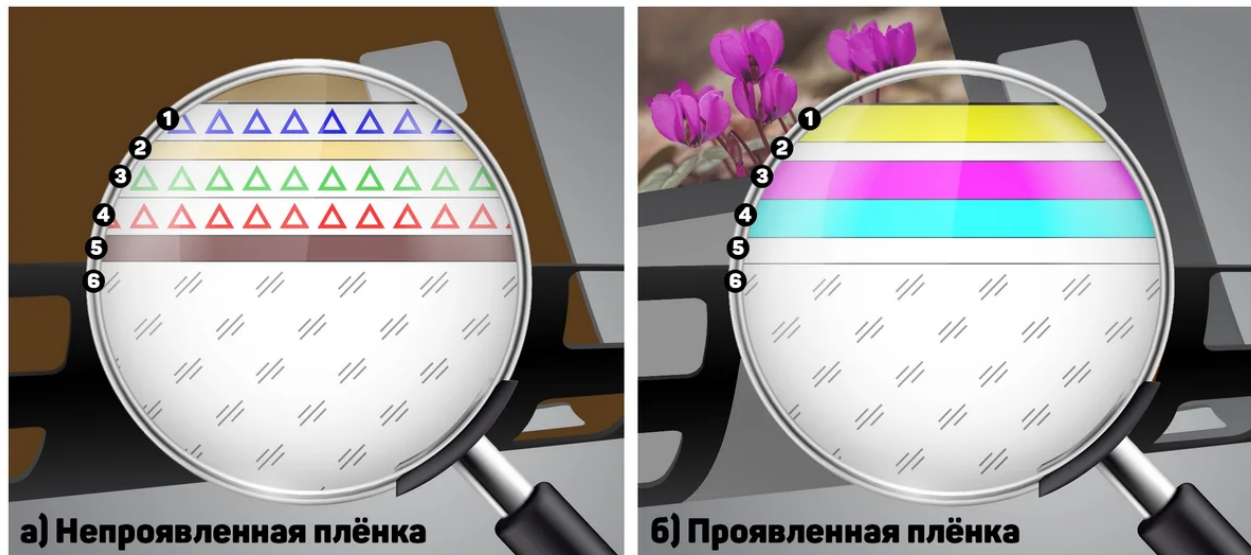
If the car slips, then the front wheels (wheel) of the front-wheel drive car are spinning, and the rear wheels are standing. In a rear-wheel drive car, the rear wheels are the drive wheels, and therefore, when slipping on a muddy road, the rear wheels spin in place, and the front wheels are stationary.

This is also about how you can distinguish a copy from the original - by "slipping". When the film is pulled, scratches remain on it. Sometimes the scratches are small, barely noticeable, and sometimes - deep, where the

emulsion is scratched. Depending on whether it is a copy or an original, the scratches will be **different in color** , since these are two films that are not similar to each other.

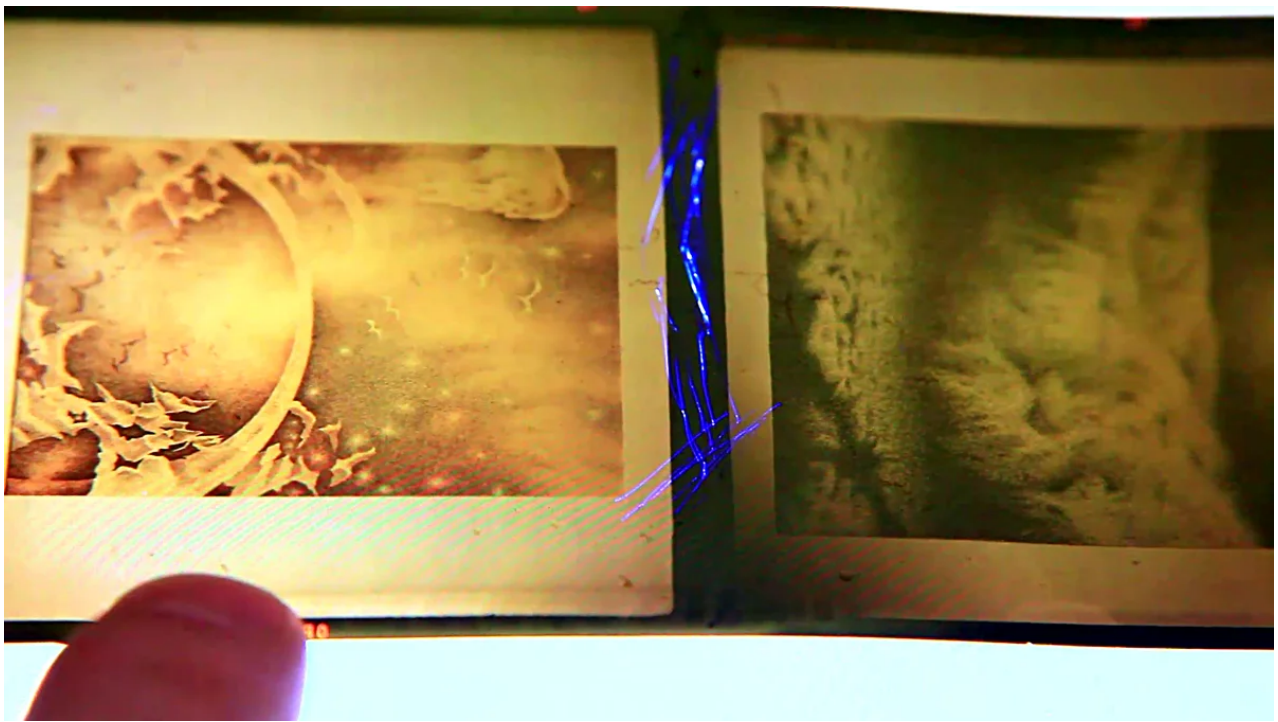
NASA claims that the color images of the moon were taken on reversible film. For example, a frame with a view of the surface of the Moon was shot on a color reversal film Kodak Ektachrome SO-368 with a light sensitivity of 64 ASA units.

An image on a color reversible film consists of three dyes, which are arranged as follows: at the top, yellow, then magenta, and at the very bottom, cyan dye (picture on the right).



The structure of reversible color film: a) - before exposure, there is a light-sensitive substance (triangles) in the emulsion layers, b) - after exposure and processing, dyes are formed.

The emulsion layers are very thin, a few microns thick, and although they are well hardened, the film must be handled with great care. If a scratch passes over the emulsion, the yellow dye is first removed, which gives the scratch a blue tint (the remaining magenta dye + cyan). A deeper scratch causes the top two layers - two dyes - yellow and magenta - to be removed, leaving only cyan on the film. Therefore, emulsion scratches on reversible film in DARK PLACES (where three dyes are present) are either blue or light blue.



Scratches on the reversible film are blue-blue (6x6 cm slides).



Gif file. Demonstration of scratching.

Film enthusiasts who shot their films in 8mm and 16mm almost always used reversible film.



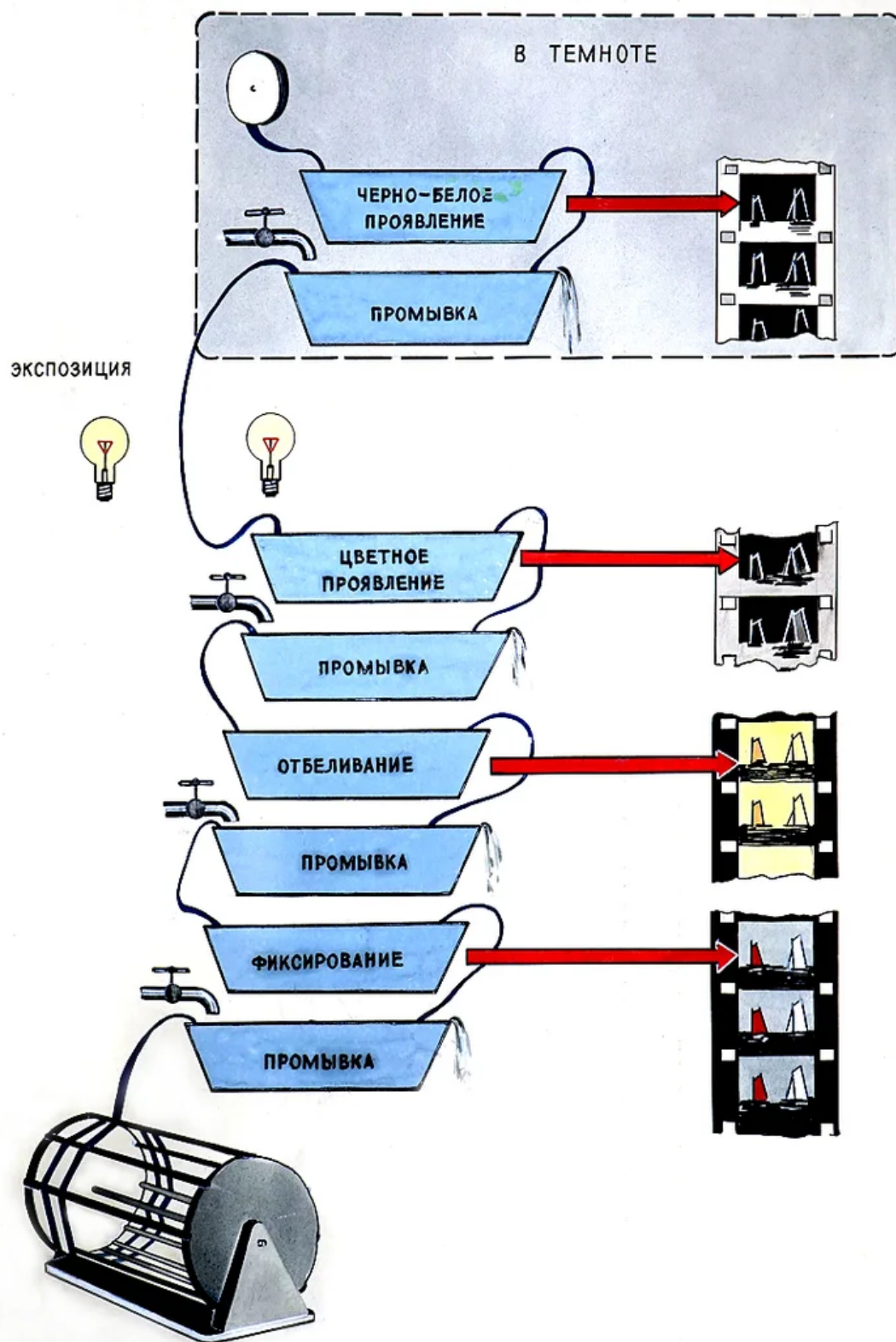
8mm reversible motion picture film for cinematographers.

Everyone knows that negative film is first developed and then fixed. The situation is different with reversible photographic film. The processing of reversible film consists of several stages.

First (after shooting) the reversible film is developed as usual. It turns out negative - the film darkens in those places where the light hit. But in unexposed places (where the light did not hit), an undeveloped light-sensitive substance remains. Then, using bleach, the negative is removed from the film. All black spots are removed. But since a light-sensitive substance remains on the film (which did not go into creating a negative image), this substance is exposed, the film is simply brought out into the light. Then they show it a second time. And now those places that were light in the negative are darkening. And those places that were black at the negative stage have been removed with bleach, so they remain light. The conversion process is in progress. After exposure and the second development on the film, a positive image is obtained in a single copy.

In the process of circulation, bleach is used - a chemical that reacts with silver. The process of processing color reversible film includes two development (black and white and color), exposure, bleaching and fixation. It looks (one of the most common options) as follows.

ПОСЛЕДОВАТЕЛЬНОСТЬ РАБОЧИХ ОПЕРАЦИЙ В ПРОЦЕССЕ ПРОЯВЛЕНИЯ ЦВЕТНОЙ МНОГОСЛОЙНОЙ ОБРАТИМОЙ КИНОПЛЕНКИ



Getting a positive image in one step.

In addition to reversible films, there are positive films. Films for cinemas were printed on them. These films are called color print film. One negative can print a huge number of positive copies for cinemas.

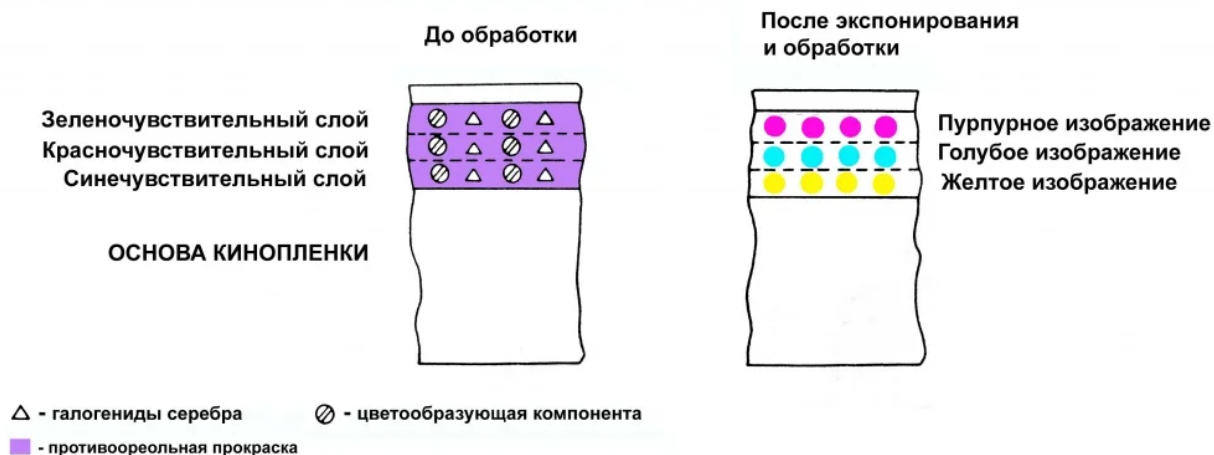


I tell the students about the positive Kodak film (color print film).

Printing from a negative onto this film is not done in complete darkness, but under special laboratory lighting, on a copier with a powerful lamp. People work in the copy department. They remove the printed rolls and transfer them for development, put new rolls of positive film on the machine, etc. To prevent the film from shining from the light scattered in the laboratory, it is made very insensitive, about 100 times less than that of reversible films. Those. only 1.5 units. Therefore, the positive film differs from the reversible film primarily by its low light sensitivity and very fine grain.

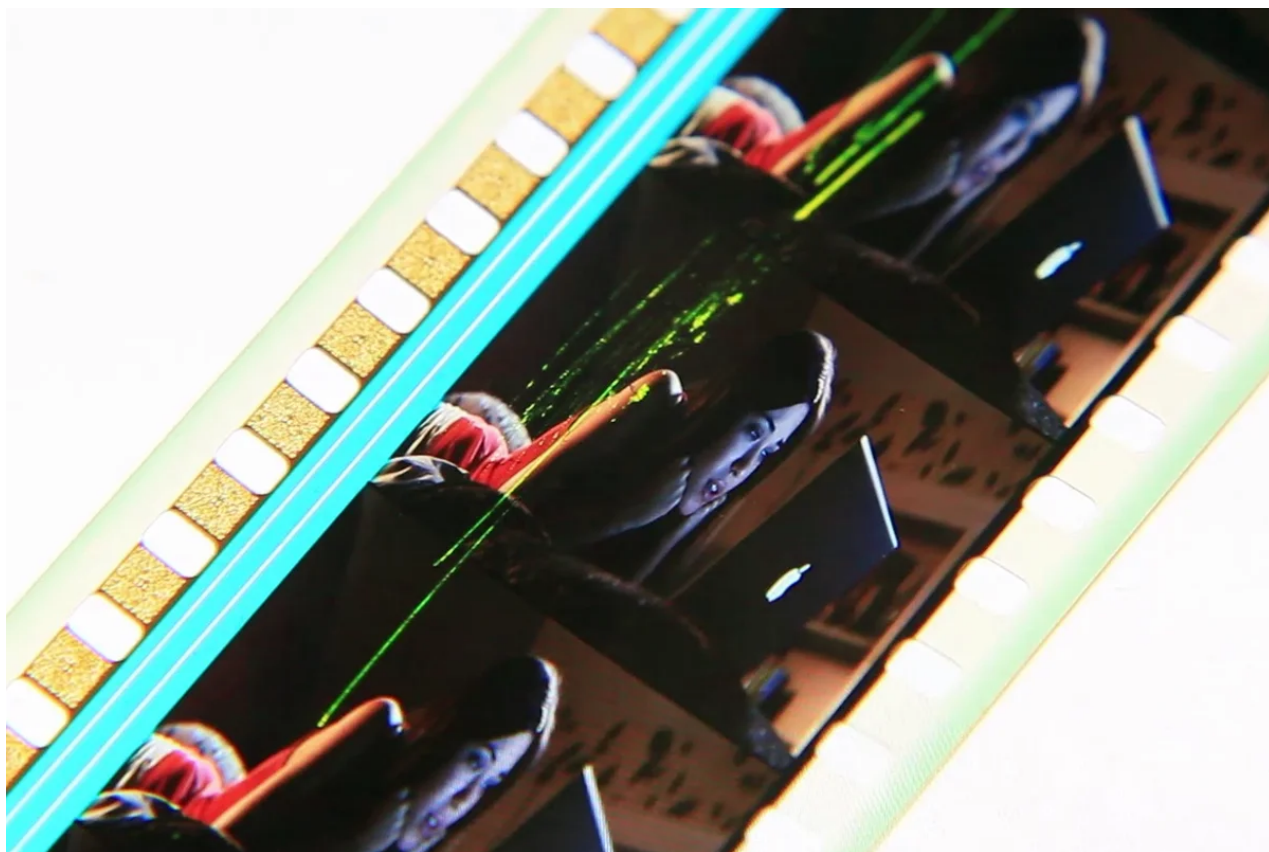
The dyes on this film are not arranged in the same way as on reversible film, but in a completely different order: purple dye goes on top, then cyan, and at the very bottom - yellow dye.

ПОЗИТИВНАЯ КИНОПЛЕНКА С ПЕРЕМЕЩЕННЫМИ СЛОЯМИ

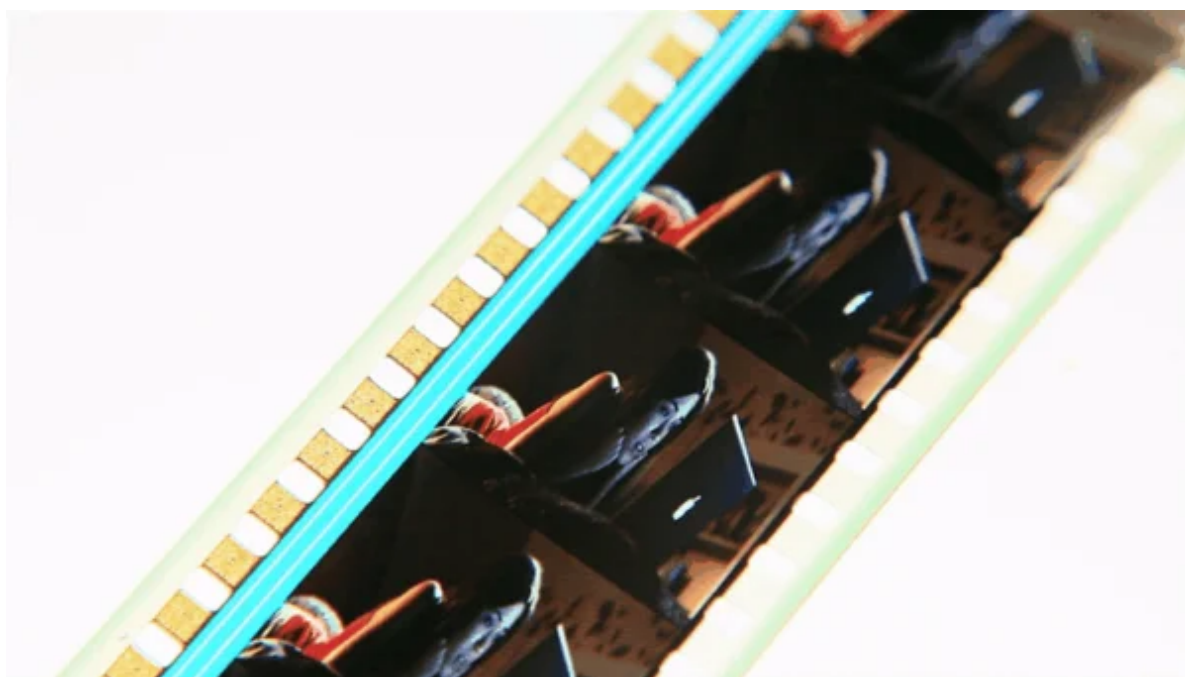


Arrangement of dyes on positive film.

This will cause scratches in dark areas (where the top magenta dye has been removed) to appear yellow-green.

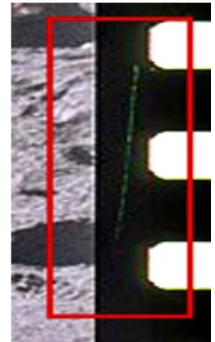


Emulsion scratches on positive film look green.



Gif file. Demonstration of the formation of scratches on the emulsion.

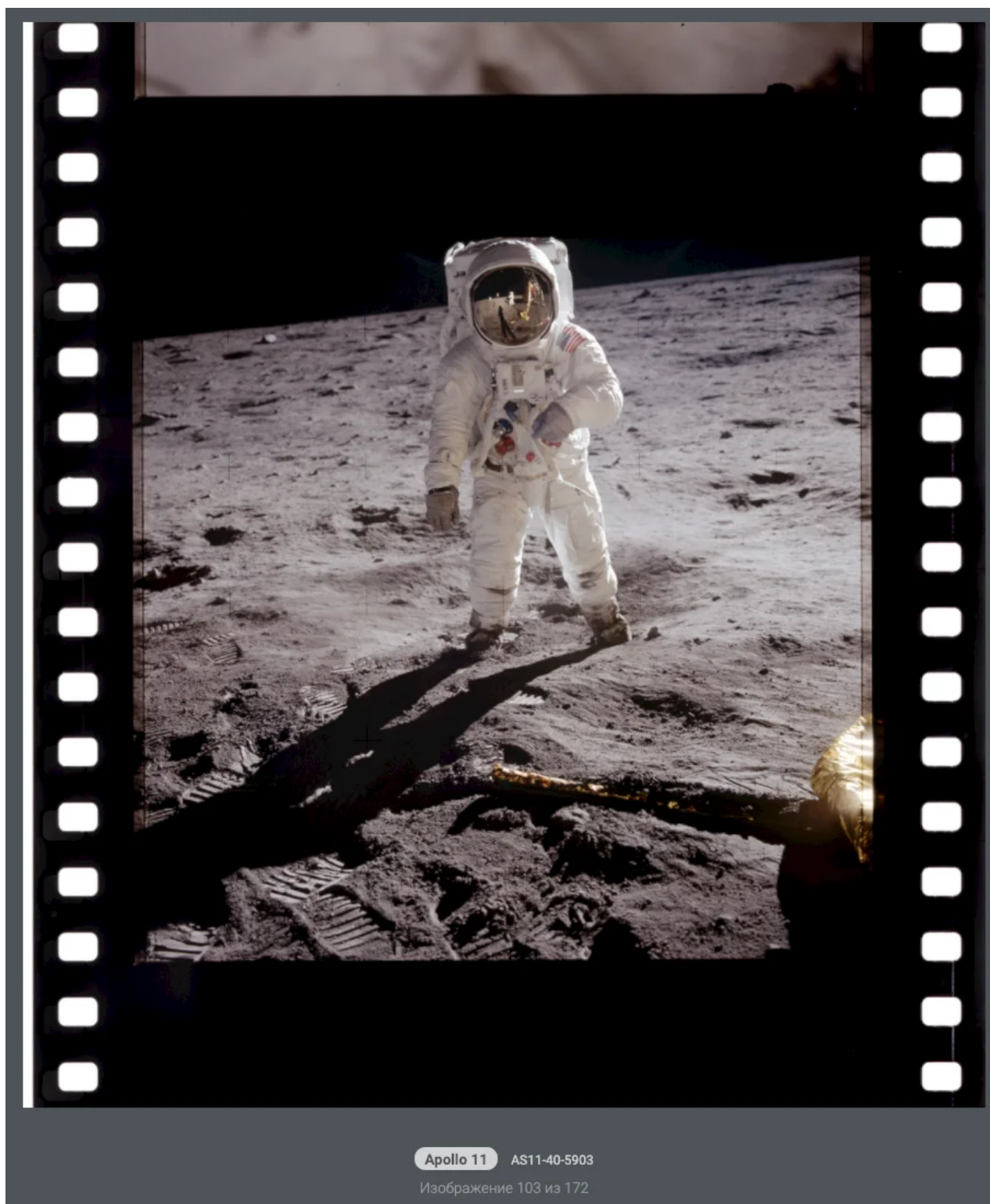
When we talked about the find of a NASA engineer, we saw that the scratch near the perforations was green. And it became quite obvious to us that this image was printed on an insensitive positive film from the negative.



Frame from a yellow box.

It is not reversible film and is not a copy made from reversible film to reversible film. This is a copy from negative to insensitive positive film. That is, the source from which a positive copy is made is **NEGATIVE**. In other words, NASA stores color negatives of moon images. And you won't read about it anywhere.

Now let's see what color are the scratches on the originals posted on the site? Take the famous astronaut dummy shot AS11-40-5903.



The famous "moon" shot.

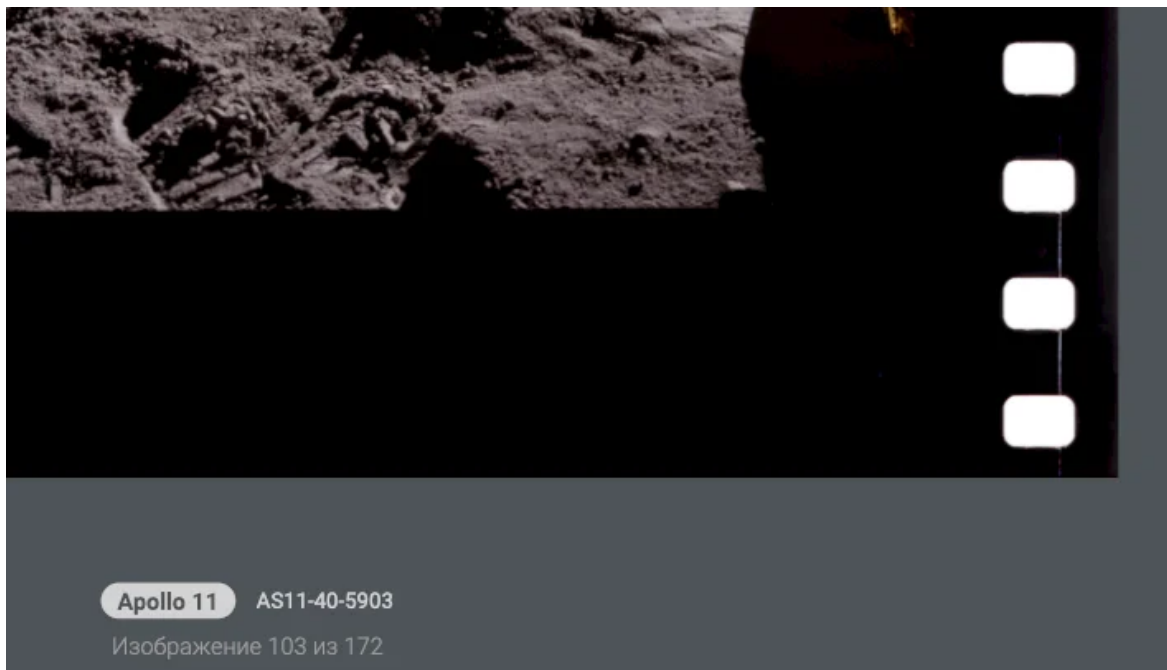
You probably know that in the "moon" photographs, instead of living people, there are mannequins? If you don't know, then read our article ["How do you depict in a photograph that an astronaut on the moon is light?"](#)

An astronaut in full ammunition (in a spacesuit) should weigh about 170 kg on Earth. And on the Moon - 6 times less, i.e. about 28 kg. How to depict in a photograph such a small weight and weak pressure on the lunar soil? NASA solved the issue simply by millet - instead of a live actor, it put a light, motionless dummy in the frame.

So the world famous photograph is not the astronaut Buzz Aldrin, but the nameless soulless mannequin.

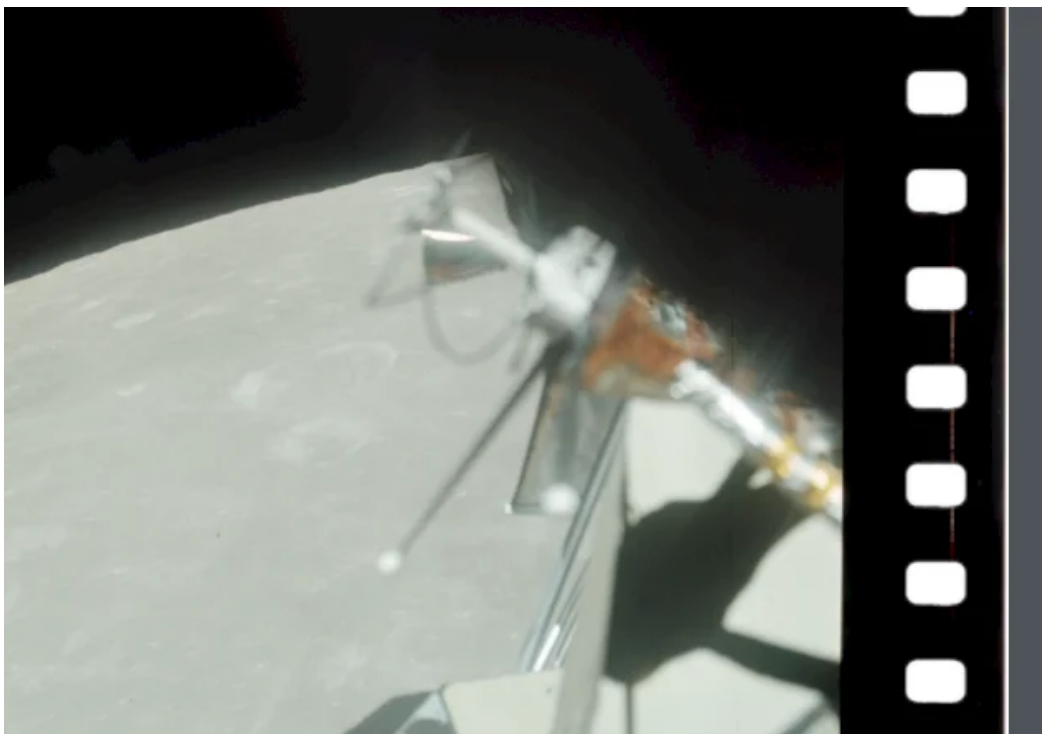
Caption under the photo: Kodak Ektachrome SO-168 EF high speed ASA 160 color reversal - color reversible high-sensitivity Ektachrome film, light sensitivity 160 ASA units.

There is a scratch at the bottom right along the perforations. Let's enlarge it.



Fragment with a scratch.

The scratch is WHITE! But this should not be! We reviewed 1,245 images and 172 more from Apollo 11. There were both color photographs and black and white. Some color photographs had scratches, and for some reason always on the right side. And there were no BLUE scratches at all! Sometimes there were RED scratches.



Red scratches.



Red scratches.

But after all, there should be blue-blue scratches on the reversing film. And they are not at all! Maybe it's some kind of plugin in Photoshop that inserts white and red scratches into the picture?

So far, those frames that we saw on the site "To the Moon" (<http://tothemoon.ser.asu.edu>) do not feel like ORIGINALS. In a folder containing 1245 images, all frames are not symmetrically placed relative to perforations (less empty space on the left, more on the right). The frames are deliberately turned into a brown tint (we turned the color correction engines in Photoshop). And there are no blue-blue scratches at all. The scratches are either white or red.

In my opinion, all these shots are not originals.

But we know what the ORIGINALS actually look like. And they are not made on reversible film Ektachrom, and not on positive film (Print film). They are made on the INTERMEDIAT film. This is a special duplicating film. And we will talk about this film in the next article. "[Why did the black space in NASA's imagery turn green?](#)"

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Cameraman L. Konovalov was with you. Until next time!